

AMENDMENTS TO THE CLAIMS:

Please amend the claims as follows:

1.(Currently Amended) An image decoding apparatus that divides a coded image data into a plurality of code blocks of a plurality of layers based on a control parameter, and carries out a first image decoding process, a second image decoding process, and a third image decoding process to each of said plurality of code blocks, comprising:

an analyzing-section-er which adapted to calculate a first process quantity for said second image decoding process and said third image decoding process within a process time that is taken for a decoding process to said coded image data, and calculate a second process quantity for said first image decoding process based on said first process quantity,

wherein said first image decoding process comprises an arithmetic decoding process and a bit modeling decoding process, said second image decoding process comprising an inverse quantization process, and said third image decoding process comprising an inverse wavelet conversion process; and determines a process quantity of a coded image data in each of a plurality of image decoding processes per a unit process time determined based on a parameter for said coded image data, prior to said plurality of image decoding processes; and

an image decoding-section-er which adapted to obtain a decoded image by executing said second image decoding process and said third image decoding process to the coded image data after said first image decoding process based on said second process quantity. carries out each of said plurality of image decoding processes to said coded image data for the determined process quantity such that a decoded image data is generated from said coded image data.

2.(Currently Amended) The image decoding apparatus according to claim 1, wherein said parameter is an internal parameter of said coded image data analyzer is adapted to calculate a process time for each of said first image decoding process, said second image decoding process, and said third image decoding process to each of said plurality of code blocks based on a predetermined process time for each of said first image decoding process, said second image decoding process, and said third image decoding process, a unit process time for each of said first image decoding process, said second image decoding process, and said third image decoding process, and a predetermined weighting quantity

assigned to said code block, and to determine a first number of code blocks, a second number of code blocks, and a third number of code blocks based on said predetermined process time and said calculated process time, and

wherein said image decoder is adapted to determine said first number of code blocks applicable with said first image decoding process within said predetermined process time for said first image decoding process, said second number of code blocks applicable with said second image decoding process within said predetermined process time for said second image decoding process, and said third number of code blocks applicable with said third image decoding process with said predetermined process time for said third image decoding process.

3.(Currently Amended) The image decoding apparatus according to claim 24, ~~wherein said parameter is an external parameter for said coded image data~~analyzer is adapted to determine said first number of code blocks based on said second number of code blocks.

4.(Currently Amended) The image decoding apparatus according to claim 24, ~~wherein said parameter contains an internal parameter of said coded image data, and an external parameter for said coded image data~~image decoder is adapted to execute said first image decoding process, said second image decoding process, and said third image decoding process from a bit plane on an MSB side, and execute said first image decoding process, said second image decoding process, and said third image decoding process to subsequent code blocks without waiting for a completion of said first image decoding process, said second image decoding process, and said third image decoding process to all of a bit plane of a current code block, when said first image decoding process, said second image decoding process, and said third image decoding process for said current code block cannot be completed within said calculated process time.

5.(Currently Amended) The image decoding apparatus according to claim ~~4~~4, wherein when said first image decoding process, said second image decoding process, and said third image decoding process to said current code block is completed within said calculated process time, said image decoder is adapted to allocate a remaining time of said calculated process time to said first image decoding process, said second image decoding process, and said third image decoding process for a portion of the code block that is not

completed within said calculated process time.

~~coded image data comprises a plurality of code blocks, and~~

~~said analyzing section determines said process quantity to each of said plurality of image decoding processes by determining a code block process quantity for each of said plurality of code blocks based on said unit process time.~~

6.(Currently Amended) The image decoding apparatus according to claim 1,
wherein said coded image data is a part of a coded stream comprises said control parameter.

~~a stream process time of said coded stream is previously determined, and~~

~~said unit process time is determined based on a number of said coded image data in said coded stream and said stream process time.~~

7.(Currently Amended) An image decoding method that divides a coded image data into a plurality of code blocks of a plurality of layers based on a control parameter, and carries out a first image decoding process, a second image decoding process, and a third image decoding process to each of said plurality of code blocks, comprising:

calculating a first process quantity for said second image decoding process and said third image decoding process within a process time that is taken for a decoding process to said coded image data, and calculate a second process quantity for said first image decoding process based on said first process quantity,

wherein said first image decoding process comprises an arithmetic decoding process and a bit modeling decoding process, said second image decoding process comprising an inverse quantization process, and said third image decoding process comprising an inverse wavelet conversion process; and

obtaining a decoded image by executing said second image decoding process and said third image decoding process to the coded image data after said first image decoding process based on said second process quantity.

~~The image decoding apparatus according to claim 6, wherein said plurality of decoding processes contains an arithmetic decoding process, a bit modeling decoding process, an inverse quantization process and an inverse wavelet transform process, and~~

~~said image decoding section carries out a set of said arithmetic decoding process and~~

~~said bit modeling decoding process, said inverse quantization process, and said inverse wavelet transform process in a pipeline.~~

8.(Currently Amended) ~~The image decoding apparatus according to claim 7, wherein said image decoding section comprises:~~

~~an arithmetic decoding section which carries out said arithmetic decoding process to said coded image data for the determined process quantity;~~

~~a bit modeling decoding section which carries out said bit modeling decoding process to a result of said arithmetic decoding process by said arithmetic decoding section in a form of bit planes every color component for the determined process quantity;~~

~~an inverse quantization section which carries out said inverse quantization process to a result of said bit modeling decoding process by said bit modeling decoding section for the determined process quantity; and~~

~~an inverse wavelet transform process section which carries out said inverse wavelet transform process to a result of said inverse quantization process by said inverse quantization section for the determined process quantity.~~The image decoding method according to claim 7, further comprising:

calculating a process time for each of said first image decoding process, said second image decoding process, and said third image decoding process to each of said plurality of code blocks based on a predetermined process time for each of said first image decoding process, said second image decoding process, and said third image decoding process, a unit process time for each of said first image decoding process, said second image decoding process, and said third image decoding process, and a predetermined weighting quantity assigned to said code block, and to determine a first number of code blocks, a second number of code blocks, and a third number of code blocks based on said predetermined process time and said calculated process time; and

determining said first number of code blocks applicable with said first image decoding process within said predetermined process time for said first image decoding process, said second number of code blocks applicable with said second image decoding process within said predetermined process time for said second image decoding process, and said third number of code blocks applicable with said third image decoding process with said predetermined process time for said third image decoding process.

9.(Currently Amended) The image ~~decoding apparatus~~method according to claim 8, further comprising determining said first number of code blocks based on said second number of code blocks, ~~wherein said coded image data is packed into a plurality of layers, said analyzing section determines a number of layers to be decoded based on said process quantity of said coded image data in said inverse quantization process and said process quantity of said coded image data in said inverse wavelet transform process, and said image decoding section carries out each of said plurality of decoding processes to said coded image data for the determined number of layers to be decoded.~~

10.(Currently Amended) The image decoding ~~apparatus~~method according to claim 98, further comprising executing said first image decoding process, said second image decoding process, and said third image decoding process from a bit plane on an MSB side, and executing said first image decoding process, said second image decoding process, and said third image decoding process to subsequent code blocks without waiting for a completion of said first image decoding process, said second image decoding process, and said third image decoding process to all of a bit plane of a current code block, when said first image decoding process, said second image decoding process, and said third image decoding process for said current code block cannot be completed within said calculated process time. ~~wherein said analyzing section discards a part of said coded image data other than a part of said coded image data associating with the determined number of layers to be decoded.~~

11.(Currently Amended) The image decoding ~~apparatus~~method according to claim 910, wherein when said first image decoding process, said second image decoding process, and said third image decoding process to said current code block is completed within said calculated process time, further comprising allocating a remaining time of said calculated process time to said first image decoding process, said second image decoding process, and said third image decoding process for a portion of the code block that is not completed within said calculated process time. ~~wherein said plurality of decoding processes contain an arithmetic decoding process, a bit modeling decoding process, an inverse quantization process and an inverse wavelet transform process, each of said plurality of layers of said coded image data contains a plurality of code~~

blocks;

~~said parameter contains a weight coefficient allocated to each of said plurality of code blocks;~~

~~said analyzing section determines a number of coding paths in said arithmetic decoding process and said bit modeling decoding process to each of said plurality of code blocks from said weight coefficients and said unit process time, and determines a number of bit planes from the determined coding paths, and~~

~~said image decoding section carries out said inverse quantization process and said inverse wavelet transform process to said coded image data for the determined number of bit planes.~~

12. (Canceled)

13. (Canceled)

14. (Canceled)

15. (Canceled)

16. (Canceled)

17. (Canceled)

18. (Canceled)

19. (Canceled)

20. (Canceled)

21. (Canceled)

22.(Canceled)

23.(Currently Amended) A computer-readable ~~recording-storage~~ medium on which a software is recorded ~~encoded with a computer program for causing a processor to perform to realize~~ an image decoding method of decoding a decoded image data from a coded image data through a plurality of decoding processes, comprising:

determining a process quantity of said coded image data in ~~each of~~ said plurality of image decoding processes within a unit process time based on a parameter for said coded image data; and

carrying out said plurality of image decoding processes to said coded image data for the determined process quantities.